

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Patent Application of:

Isao Kurihara et al.

Conf. No.: 4470

Group Art Unit: 1764

Appln. No.: 10/800,949

Examiner: Ellen McAvoy

Filing Date: March 15, 2004

Attorney Docket No. 8305-239US  
(NP149-1)

Title: LUBRICATING OIL COMPOSITION FOR INTERNAL  
COMBUSTION ENGINE

DECLARATION UNDER 37 C.F.R. § 1.132

I, Isao Kurihara, declare and state that:

1. I graduated from Tokyo University of Science, Faculty of Engineering and Department of Industrial Chemistry and was conferred a master's Degree from the same university.

I was employed by Mitsubishi Oil Co., Ltd. in 1993. Currently, I am employed by Nippon Oil Corporation, which is the assignee of the above-identified patent application in their Lubricants Research Laboratory, where I have been actively engaged in the research and development of lubricating oils, focusing on particularly lubricating oils for transmissions.

2. I am well acquainted with the field of lubricating oils and therefore conducted experiments described below on behalf of the assignee.

3. I have reviewed the Office Action dated April 3, 2007 in the above-identified application, and copies of U. S. Patent Nos. 6,569,818 B2 (Nakazato et al., "Nakazato") and 6,306,801 B2 (Yagishita et al., "Yagishita") in which the Examiner has rejected all of the pending claims under 35 U. S. C. §103 (a) over Nakazato, and Yagishita in combination with Nakazato. This Declaration has been prepared to address the arguments made by the Examiner in support of his rejections of the claims.

4. It is my understanding that the Examiner's positions are as follows.

Noted  
Ellen  
10-22-2007

That is, as for Nakazato, since all of the components of applicant's claims are taught by Nakazato, the claimed invention is clearly encompassed by Nakazato.

As for Yagishita in combination with Nakazato, Yagishita discloses a lubricating composition comprising (a) a mineral lubricating base oil, (b) acylated bis - succinimide, (c) zinc dithiophosphate, and (d) a metallic detergent. However, Yagishita does not teach addition of a phosphorus-containing ashless anti-wear agent and a fatty acid amide to the composition.

In this regard, since Nakazato teaches that the composition may contain other auxiliary additives such as phosphoric acid esters, phosphorous acid esters and organic amide compounds, it would be obvious to the skilled lubricating oil formulator to complete the composition with the desired properties as claimed by adding any conventional engine oil additive as taught by Nakazato to the lubricating oil compositions of Yagishita.

5. In order to overcome the Examiner's rejection, I have amended the current Claims 1 and 2 by limiting Component (C), i.e., a phosphorus-containing ashless anti-wear agent to amine salts of phosphoric acid esters and/or phosphorous acid esters and the amount of sulfated ashes contained in the composition to 0.3 to 0.6 percent by mass.

6. Further, in order to demonstrate and prove the advantage of the amended claimed composition, I have conducted additional comparative experiments as Reference Examples in the same manner as that described at page 30, line 17 through at page 32, line 12 in the specification.

The compositions of Reference Examples 1- 3 were each prepared by substituting phosphite of (D) Component of the composition in Inventive Example 2, 6 and 7 with amine salt of phosphite as set forth in Table A below, and adjusting the P concentration in the composition to the same level, respectively.

The experimental results of Reference Examples 1- 3 are set forth in Table A below together with the results of Inventive Example 2, 6 and 7.

Table A

	Ex. 2	Ref. 1	Ex. 6	Ref. 2	Ex. 7	Ref. 3
Base Oil /Mineral Oil	balance	balance	balance	balance	balance	balance
(A)succinimide-based ashless dispersant	8.0	8.0	8.0	8.0	8.0	8.0
(N concentration: mass %)	0.13	0.13	0.13	0.13	0.13	0.13
(B)metallic detergent						
Ca salicylate			2.0	2.0	2.0	2.0
Ca sulfonate	0.8	0.8				
(C)Zn sec-alkyldithiophosphate	0.95	0.95	0.70	0.70	0.40	0.40
(P concentration: mass %)	0.068	0.068	0.050	0.050	0.029	0.029
(D)Phosphorus-containing ashless anti-wear agent						
Phosphite		0.8		0.5		0.4
Amine salt of phosphite	1.0		0.6		0.5	
(P concentration: mass %)	0.025	0.025	0.015	0.015	0.013	0.013
(E)Fatty acid amide					0.3	0.3
Other additives	2.6	2.6	2.6	2.6	2.6	2.6
Ca concentration mass %	0.10	0.10	0.12	0.12	0.12	0.12
Zn concentration mass %	0.074	0.074	0.055	0.055	0.031	0.031
P concentration mass %	0.093	0.093	0.065	0.065	0.041	0.042
N concentration mass %	0.18	0.18	0.18	0.18	0.17	0.17
Sulfated ash content mass %	0.57	0.57	0.59	0.59	0.56	0.56
(1)High-velocity four-ball wear test						
Wear scar diameter (Fresh oil) mm	0.35	0.36	0.35	0.42	0.36	0.45
Wear scar diameter	0.40	0.40	0.35	0.53	0.40	0.57
(Oil deteriorated by ISOT) mm						
(2)Hot tube test						
Rating(290°C,16h)	7.0	6.5	7.5	7.5	8.0	8.0

7. It is apparent from the results set forth in Table A that the composition of Reference Example 1, which contains phosphite as (D) Component, exhibited poor performance in respect of high temperature detergency evaluated by the Hot tube test, though it exhibited almost the same performance in respect of anti-wear properties evaluated by the High-velocity four-ball wear test, compared with that of Inventive Example 2.

Further the compositions of Reference Examples 2 and 3, which contain phosphite as(D) Component, exhibited poor performance in respect of anti-wear properties evaluated in the High-velocity four-ball wear test, though they exhibited almost the same performance in respect of high temperature detergency evaluated in the Hot tube test, compared with those of Inventive Examples 6 and 7, respectively.

8. I declare further that all statements made herein of my own

knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: 27 July, 2007

Isao Kurihara  
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